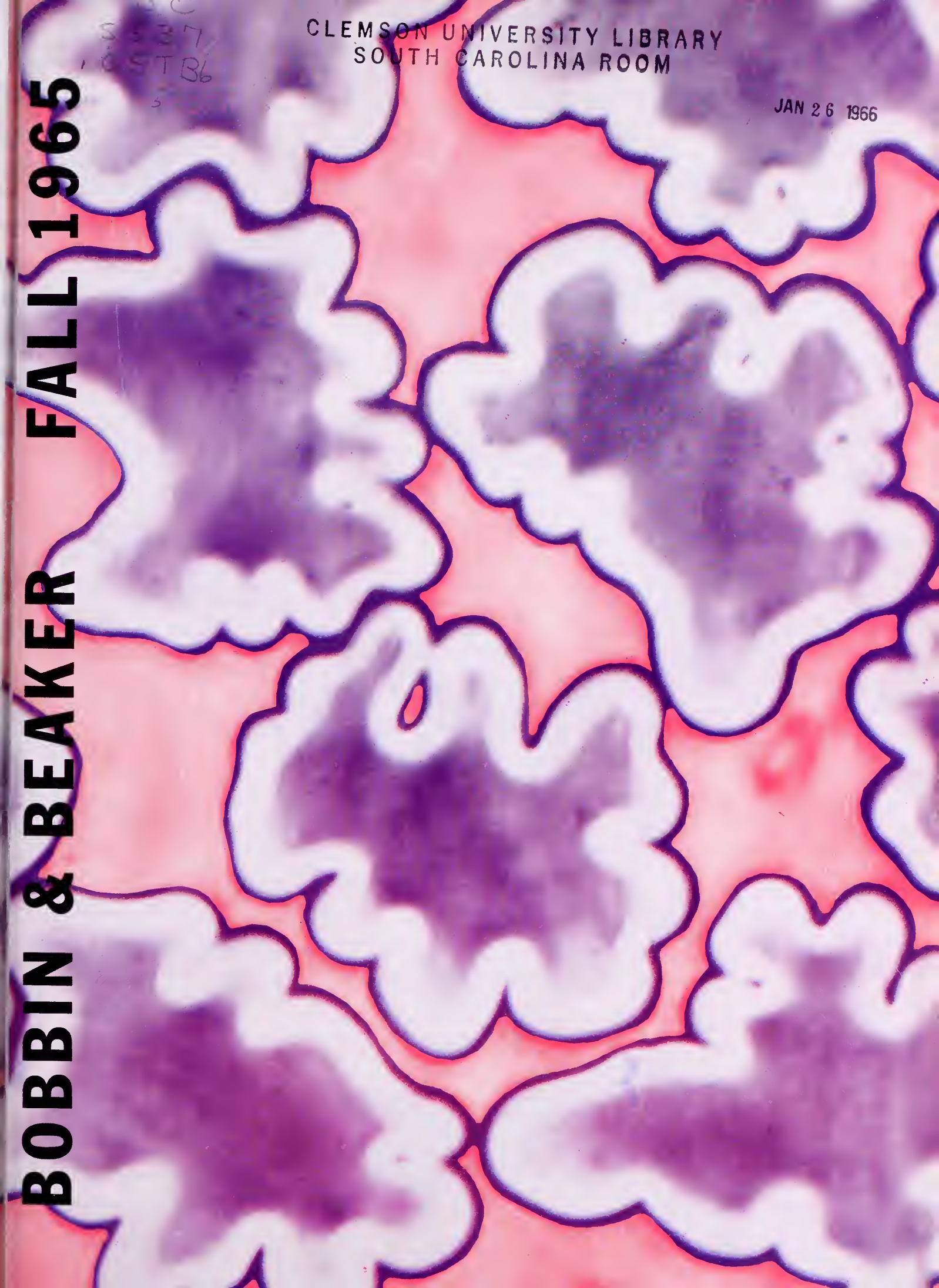
1965

The Bobbin and Beaker Vol. 23 No. 1

Clemson University

BOBBIN & BEAKER FALL 1965



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TEXTILE DICTIONARY
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in Textile Processing

C

Corobex (Kôr 'a-bex)

A durable anti-bacterial additive for textiles. Provides fixed, lasting protection against germs, mildew, perspiration odors and other odors of bacterial origin.

Easily applied during dyeing or finishing operations. Will cause no shade change in dyed and printed colors, no yellowing of whites. Does not affect the hand of the finished goods. Compatible with most types of finishing materials.

D

Discollte[1] (dĭs'kō·līte)

Concentrated sodium sulphoxylate formaldehyde available in lump, pea, rice or powder form.

A powerful reducing agent, stable at high temperatures. Widely used to effect reduction and solution of vat colors, and for discharge effects when applied to colored grounds. Effective when mixed with vat colors and discharge pastes wherever the reducing agent must retain its reducing power after being dried into the fabric.

Dispersall (dĭs·pûr'sal)

A long chain ethylene oxide condensate in the form of a colorless, neutral, somewhat viscous liquid. Fully resistant to hard water, and miscible with water in all proportions. A retardant and leveling assistant in vat dyeing.

Used widely as a dispersing agent in dyeing synthetic fibers with disperse colors and for fast color salts and bases in Napthol dyeing and printing.

Effective in stripping to prevent redeposition of the color on stripped goods.

N

Neofinish (Ne/.O.Finish)

Non-Ionic softener dispersible in hot water, suitable for all textile fibres, both natural and synthetic. Compatible with all types of finishing materials, including resin finishes. No development of color or odor in goods finished with Neofinish, even in storage. No yellowing at time of application.

Neowet (nē'ō·wĕt)

Complex Polyethelene Ether in the form of a pale yellow, slightly viscous liquid.

A non-ionic surface active wetting agent, effective at all temperatures. Completely compatible with enzymatic desizing agents and readily soluble in water. Contains 43 1/4% active ingredients. Widely used in scouring all types of textile fabrics and for general wetting purposes.

Neowet X (nē'ō·wĕt)

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An anionic surface active wetting agent, effective at all temperatures. Does not affect enzyme activity in desizing. Compatible with hydrogen peroxide and resin finishes. High detergent value. Contains 20% active ingredients.

Neozymes[2] (nē'ō·zīms)

Desizing agents made up of amylolytic, proteolytic and fat splitting enzymes available in the form of crystalline powder or liquid concentrate for high or low temperature requirements.

Neozymes quickly remove all trace of starch glue or gelatin sizing without danger of damage to even the most delicate fabrics. For best results, use with NEOWET to speed saturation.

P

Parolite[3] (păr'ō·līte)

Zinc sulphoxylate formaldehyde in the form of white crystalline powder. A highly concentrated stripping agent for all forms of wool and modern synthetics.

Completely soluble in water. Leaves stripped goods soft, completely free of zinc dust and in most receptive condition for further processing. Often completely strips goods where other stripping agents fail. Very effective in discharge printing on acetate rayon.

V

Vatrolite[4] (văt'rō·līte)

Concentrated sodium hydrosulphite in the form of white crystalline powder. A powerful reducing agent for vat colors, ideal for dry feeding because of its free flowing, dustless character. Completely soluble in water.

Effective stripping agent for direct, sulphur and vat colors on cellulosic fabrics.

Quickly removes rust stains from cotton goods.

May be stored indefinitely.

Available with optical whites and in buffered formulas for high temperature use without excessive alkalinity.

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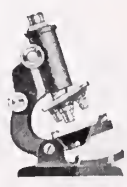

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THE

Bobbin & Beaker

Official Student Publication
Clemson School of Industrial Management and Textile Science

VOL. 23 FALL ISSUE 1965 NO. 1

The Staff

In This Issue

THE BOBBIN & BEAKER. Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge four times during the school year by students of the Clemson University School of Industrial Management and Textile Science.

Address: The Bobbin and Beaker, School of Industrial Management and Textile Science, Clemson University, Clemson, South Carolina.

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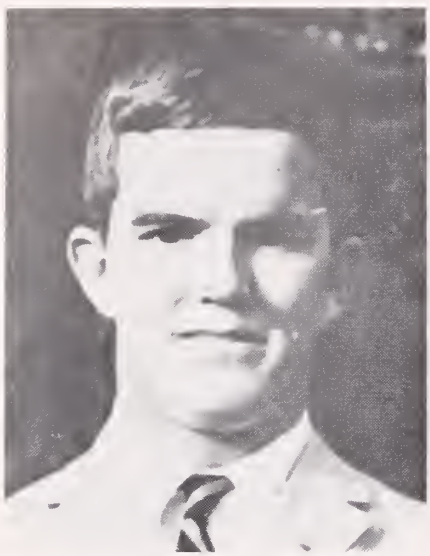

from the Editor

In this, the first issue of the year, we have received permission from the S. C. Textile Manufacturer's Association to reprint two articles from their last meeting in Spartanburg. Our grateful thanks go out to them. Also included is a report on the 1965 Professional Development Program and several undergraduate research abstracts.

We feel we must say that there will be only one more Bobbin and Beaker. All advertisers please note this. We greatly appreciate your support over the past years.

A Merry Christmas and happy rewarding New Year to All!

—S. E. G.

Wes Connelly

Bruce Edwards

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ONE INDUSTRY - MANY FIBERS

An Address By

J. C. Cowan, Jr.
Burlington Industries, Inc.
South Carolina Textile Manufacturers' Association
News Seminar
Spartanburg, S. C., October 4, 1965

It is a genuine pleasure for me to talk with you today. We in textiles recognize the need for exchange of information between industry and the press. The future of our company and others represented here today depends upon public understanding — not only of our role in the economy, but of the atmosphere in which we do business, the forces to which our industry is exposed and the techniques we follow in keeping ahead in this age of rapid change.

We recognize your role as guardian of public information, and we are largely dependent upon you and your various media for the image which we of the textile industry project.

Fiber complexity in the textile industry is a fascinating subject — one which holds much of the secret of the industry's current prosperity and which certainly will affect its future.

We pick up the thread of the textile industry back in the very earliest years of history. One wit has said that textiles came into style when the fig leaf went out. It's pretty nearly appropriate, for textiles is an extremely old industry. Records trace the weaving of cloth back well over 3,000 years before Christ to the Nile Valley of Egypt. Fragments of ancient cotton bolls and woven fabric found in a Mexican cave are estimated to date back to about 5,800 B. C.

Through most of its early history, textiles was a home industry. There was very little complexity to fibers in those early days. People used what the land provided — cotton, flax, wool, jute, mohair, and silk. These fibers were the raw materials for some of the earliest, and incidentally some of the most beautiful fabrics known to man.

They were woven first by hand and later by crude instruments. A paradox about the textile industry is that the basic principle of weaving remains about the same as it was then. The vast difference today is in the speed and flexibility of modern machinery, the variety and combinations of fibers, and the methods of finishing fabrics.

The textile industry triggered the American Industrial Revolution. Samuel Slater's textile mill, completed in Pawtucket, Rhode Island, in 1793, was the beginning of the factory system of manufacture in this country. Eli Whitney's Cotton gin of 1794 elevated Southern states to the forefront of cotton producing areas of the world, and gave tremendous impetus to the cotton textile industry in the Southeast and along the Atlantic Seaboard.

These inventions, important as theye were, become very pale indeed in the light of more recent advances in the industry. More change has occurred in textiles during the past 25 years than in all prior history. We could describe this as the beginning of the era of multi-fibers, the break from dependence upon natural fibers and the emergence of man-made fibers which today cover the entire spectrum.

Production of man-made fibers, with all of its modern embellishments, actually simulates the manufacturing of silk threads by the lowly silk worm, that is, the extrusion of a liquid substance through spinerettes to form a tiny strand which solidifies.

History tells us that the silk thread was discovered quite by accident. In the year 2640 B. C. a Chinese empress is said to have dropped a silkworm cocoon into a pail of hot water. When she picked it up she noticed that the threads unraveled from around the cocoon. So an industry was born.

The natural phenomenon of the silkworm fascinated scientists, whose continuing efforts have produced myriad filaments with diverse properties and uses.

Basically, production of man-made fibers falls into three categories: The **solvent** method in which a polymer solution in a solvent is forced through tiny holes into warm air. The solvent evaporates and leaves the liquid filament to solidify.

The second technique is the **wet** method — where a polymer solution passes through tiny holes into another solution where it coagulates.

The third is the **melt** method, where a solid polymer is melted and forced through tiny holes into air where it cools and solidifies.

I'll not burden you with a scientific explanation of the term "polymer." Suffice it to say that a polymer is merely a union of simple molecules into giant molecules and the lining up of these molecules into a chain-like effect to form a filament.

Making them line up properly poses problems much like those of the drill sergeant with a platoon of raw recruits who don't know left from right. Scientific refinements of the simple spinning principle have solved the problem, however, and the man-made fibers produced today have molecules well in line to form some of the most durable filaments ever devised by man or nature.

Problems beyond the mere extrusion of the initial filaments include those of drawing the fiber to give it strength; putting certain additives in the polymer to give it the desired luster, sunlight resistance or heat stability; crimping it if it is to be cut into staple; adding finish so that it will handle well in mill processing; and even developing special dyestuffs and techniques so that it can be dyed in a full range of colors.

Burlington Industries actually cut its teeth on one of the first man-made fibers — rayon. This fiber, made of chemically treated cellulose from wood pulp or cotton linters, is generally considered a European invention of the 19th century. It sorigin goes back to earlier days, to tapa cloth of the Marquesas Islands, where natives produced fiber from a gummy substance found in the bark of mulberry trees.

As early as 1664, Dr. Robert Hooke of England predicted the coming of this "artificial silk." In 1886 a commercial process for its production was exhibited at the Paris Exhibition.

In 1910 the first successful plant for the manufacture of rayon by the viscose process was opened at Marcus Hook, Pa., and two years later rayon hosiery was first marketed successfully. The first rayon knitted outerwear appeared in 1916.

Kenneth Lord, Sr., one of the founders of what is today Burlington Industries' Galey & Lord division, coined the term "rayon" in 1924.

In 1925 Spencer Love converted a small cotton mill to rayon fabric production. Burlington's first plant to produce rayon dress goods was constructed in 1927.

Through quality control and close scrutiny of production techniques, Burlington weathered the so-called "rayon depression" and emerged as one of the leaders in the use of the new yarn.

Dr. W. H. Carruthers of DuPont made another giant step in development of man-made fibers in 1930 when he produced the first nylon, now the leading true synthetic fiber, whose tremendous strength and versatility makes it desirable for such diversified and demanding uses as safety belt webbing, sheer stockings, protective body armor and intimate lingerie.

* * * * *

The complexity of any industry is determined by two things — the number of raw materials used in the final product and the number of operations necessary to reach the final product stage.

The textile industry in recent years has risen high up the range of complexity. At the top, of course, is the chemical industry which has something like 92 different raw materials and an infinite number of processes.

Chemicals have contributed a great deal to the progress of textiles, and the two industries have moved ahead in one of the most impressive alliances of productive effort in the history of American industry.

South Carolina, with its heavy concentration of textile and synthetic yarn plants, illustrates how the two have grown up together, all for the betterment of the state.

The latest index of man-made fibers of the world lists more than 2,000 different fibers by trademark. The majority of these fibers can readily be distinguished by chemical or physical means.

During World War II there were only a very few nylon descriptions available; today DuPont alone offers more than 1,100 distinct nylon products broken down into, at latest count, 47 different types.

It is impossible to estimate with any certainty how many raw materials we use in the textile industry, even if we were to exclude dyestuffs and finishing compounds, which are in a world of complexity all their own.

At the present time we at Burlington use eight natural fibers — cotton, wool, silk, jute, flax, mohair, alpaca and rubber — and more than 30 man-made fibers. I'll not try to enumerate them. Blends of natural and man-made fibers are almost limitless in number.

While development of this wide variety of man-made fibers has been a challenge to the scientist, practical use of them in various combinations has fallen the lot of the textile industry itself.

In effect, the complexity presents an opportunity of variety, and a challenge of selectivity. Someone, somewhere in the production set-up must pick the right fiber for the right job. He must decide whether Avrill, Lirelle, Nupron, Xena, Zantrell or Zantress

700 is to be used in a particular fabric construction. And you can project this selection maze on and on. Is it any wonder that we and other textile companies place a growing dependence upon chemists and quality engineers in our business?

The selection is not always left to us. Sometimes a customer influenced by past experiences, consumer acceptance or the amount of promotion given a particular fiber, will call the shots and specify a certain fiber in a certain fabric. However, most of the burden of selectivity is left with the textile industry. The industry has worked the bugs out of many new fibers and through tests has found the most practical, and most marketable place for them.

The public has been the beneficiary, through a wider selection of fabrics, engineered for specific end uses to provide greater wear value, versatility and economy.

* * * * * *

There was a move back at the turn of the 20th century to do away with the U. S. Patent Office — on the theory that everything worth inventing had already been invented.

We would be just as foolish to think that we have reached the ultimate in development of fibers. When we think we have all the answers, when we think we've made all the progress conceivable, some enterprising young scientist discovers an altogether new textile raw material or technique — and we're off and running again.

This is as it should be, because change and challenge are the mark of the successful industry.

Two of the very latest developments in textiles appear to be most promising: stretch fabric and durable press, one involving the use of new fibers or specialized mechanical or chemical processes, and the other involving new fabric finishes coupled with newly developed garment pressing or oven treatment techniques.

It now appears that the next step in our continuing efforts to give the consumer what he wants will be to combine the features of stretch and durable press into the same fabric. This deelopment is in the works.

Glass fiber as a base material for textile fabric is a relatively new development. Glass neither rots, mildews, burns or deteriorates under exposure to sunlight.

Wash and wear is a household term today, but it is a concept introduced only 15 years ago.

These properties have given us an almost unlimited and highly sophisticated variety of fabrics for apparels, home furnishings and industrial markets.

* * * * *

Have we reached a saturation point in fiber diversity? I think not. Latest estimates made at a seminar on fibers by the American Management Association indicate that by 1975 the market will require 10 billion pounds of man-made fibers a year, an increase from 7.9 billion pounds this year.

Clemson only recently announced development of a new variety of cotton whose qualities could mean greater use of native cotton by textile manufacturers.

Promotion by manufacturers will continue, with improved production skills and greater volume likely leading to lower material costs. Research and development will uncover new fiber modifications, new methods and special properties permitting further adoption of man-mades for greater variety in end uses.

Nylon manufacturers believe that textile nylon use will double by 1975, about half of that to be used in apparels such as textured outerwear tricot, circular knit textured dress goods, outerwear fabrics and broadwoven stretch fabrics. A 29 per cent increase in nylon hosiery is expected over the same period. Nylon yarn for carpets will increase about 55 per cent.

We can assume that similar, if less dramatic, growth will be shared by other man-made fibers which perform well for the buying public. New ones will surely appear by 1975.

So, what we term complexity of fibers in the textile industry today is likely to be viewed in retrospect as just another era of experimentation and development several years hence. We view the 1930's in the same light today.

This is the pattern of progress, however, and we must gear our operation to keep pace. Viewing the industry long range, I can see the greater fiber complexity, or diversity if you choose, will continue to be a major factor in the growth of textiles. We have met the challenge in the past, and I believe we are better equipped to meet the challenge of the future, however great it might be.

Complex as the industry might be, we still depend upon simple things — public understanding among them. Many of you will say that this is a relatively new point of view for the industry, and I suppose you are right. We **do** value your interest, however, and your desire to better understand our industry which plays such a vital role in the economy of South Carolina.

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COTTON YARNS

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PIEDMONT PROCESSING COMPANY

Belmont, N. C.

THIS TRIANGLE, a mark of distinction, guarantees dyed and bleached yarns with superior knitting and weaving qualities. Wherever you see THIS TRIANGLE, you can be sure that quality fabrics are being produced.

Substantial investments in modernization and expansion projects in recent years have resulted in increased sales of yarns produced at this plant.

The continued growth of Piedmont is ample proof that modernization is imperative in today's competitive markets.

Fancourt Seminar

Record attendance and a varied and instructive program characterized the Fourth Annual Walter F. Fancourt Memorial Seminar held in Greensboro on October 28-29.

Some 55 faculty members and students from 13 Carolina colleges and universities plus leading figures in the textile industry attended the two-day session this year, during which they visited two modern textile plants, learned of new textile developments in military clothing and equipment, and participated in a job opportunities discussion.

Founded in 1962 by John L. Fancourt in memory of his father and older brother, the Seminar annually brings together a group of college students to learn about the potentials of a textile career from top-flight industry representatives.

Principal speaker at the Seminar banquet was Erwin O. Kruegel, Special Assistant for Research and Development Liaison, Defense Supply Agency.

Suggesting to his audience that there were six criteria by which to assess an industry in terms of a future career, Kruegel gave high marks to the textile industry in all—progress record, dynamic quality, career opportunities, geographical location, starting salaries, and contributions to national defense. He pointed out that there were excellent openings available for young people in both private industry and government positions conneced with textiles.

Kruegel said that improved clothing and other textile products have added greatly to the efficiency of the American fighting men in Viet Nam, and, by reducing superfluous weight, enable him to function more effectively than his counter-parts of either World War II or Korea.

Among the articles that Kruegel used to illustrate his talk were new combat boots with the soles vulcanized directly to the uppers and a nylon mesh insert for ventilation. The shoes come equipped with a stainless steel insole in order to protect against sharpened bamboo stakes that the Viet Cong uses as booby traps.

A new light-weight rucksack was also shown. Weighing several pounds less than previous equipment, the pack carier is also designed for instant removal in case of attack so that the soldier will not lose valuable time or be hampered by his equipment during an ambush.

Kruegel also showed a nylon helmet that, used with the conventional steel helmet has reduced head injuries by 50%, a jungle hammock, an armored vest for protection against fragmentation weapons, and a light-weight, non absorbant blanket.

Visitors from Clemson University to the Fourth Annual Walter F. Fancourt Memorial Seminar in Greensboro, N. C., watch the preparation of container for shipping chemicals from the W. F. Fancourt Co. Left to right are: Professor D. P. Thomson, Will T. Brown, Jr., Covington, Ga.; Bruce R. Edwards, Tryon, N. C.; John C. Willis, Clemson, S. C., and James R. Jensen, Alexandria, Va. The Fancourt Co. sponsors the two-day event each year for the benefit of college students who may be interested in a career in textiles.

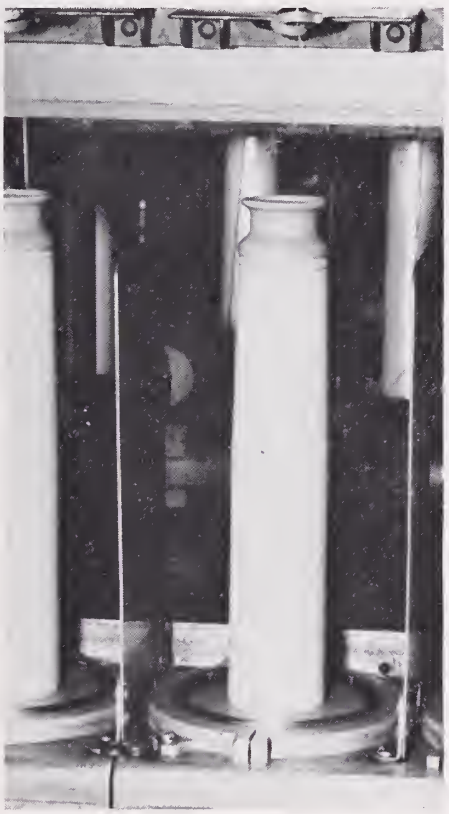
On Thursday afternoon and Friday morning, the Seminar visited the Elm Street Plant, Carter Division, of J. P. Stevens Co. in Greensboro, and the J. Spencer Love Hosiery Center of Burlington Industries in Burlington.

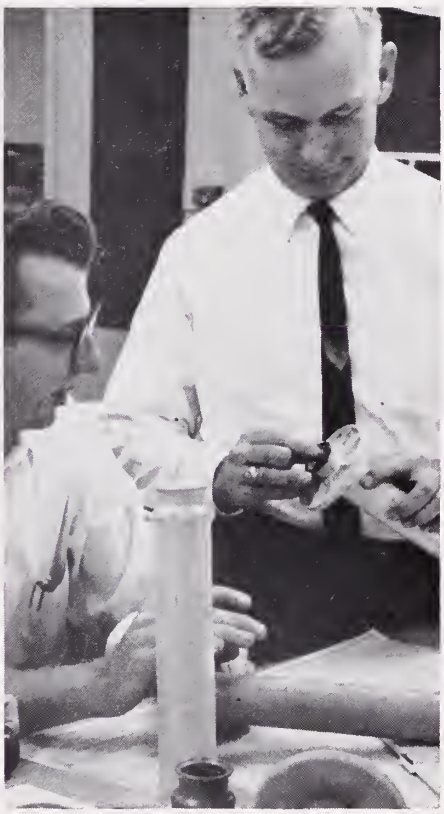
The final session of the Seminar on Friday afternoon was devoted to a Job Opportunities Panel at which industry spokesmen outlined their opinions on future of young people in textiles and answered specified questions from the floor.

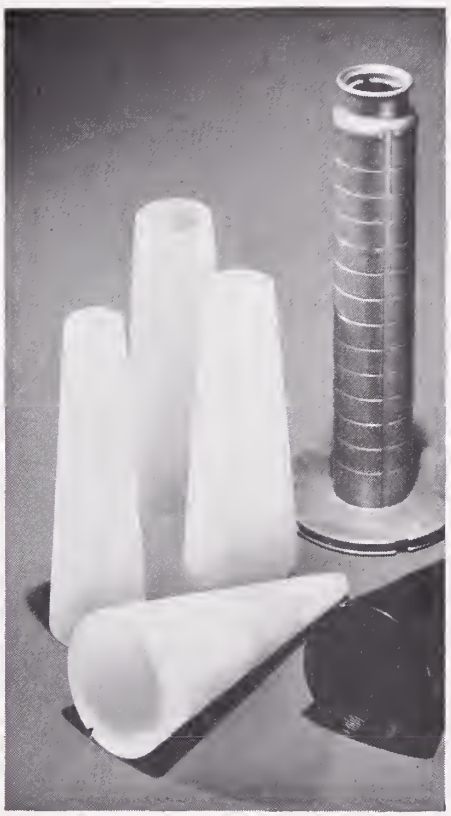
Participating in the panel were Maurice Fishman, vice president and technical director, Guilford Mills, Inc.; Clifton H. Karnes, director of Central Research and Development Laboratories of Burlington Industries, Inc.; Odis E. Little, manager, Industrial Relations, Synthetics Division, J. P. Stevens & Co., Inc.; and Thomas H. Ward, Jr., manager, Recruitment and Employment, Cone Mills Corporation.

Some 55 students and faculty members attended the Seminar, representing 13 colleges: Belmont Abbey, Catawba, Clemson, Davidson, Duke, Elon, Guilford, High Point, North Carolina State, University of North Carolina at Chapel Hill, University of North Carolina at Greensboro, University of South Carolina, and Wake Forest.

SONOCO leadership meets the challenge...







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Typical of these plastic products are bobbins for glass fiber and other synthetic yarns. They possess great strength, dimensional stability and are custom-formed and finished to close tolerance in various grades of thermoplastic. Like all carriers in this category, they are suitable for repeated use.

With its over 65 years' experience in yarn carriers, Sonoco is well qualified to assume leadership in exploring the application of plastics for this purpose. *Only Sonoco* has the necessary research and design facilities. For example, inexpensive product samples can be furnished for customer evaluation. Continuing research is being conducted in the area of plastic cones, with a variety of types currently undergoing tests in mills and in our laboratories.

The exhaustive research devoted to plastic carriers is typical of that which is part of *every* Sonoco product. For Sonoco customers it means economy and dependable performance. *Don't settle for less!*

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TEXTILES IN THE MARKET PLACE

TEXTILE NEWS SEMINAR

Sponsored By
The Public Relations Division
of the
South Carolina
Textile Manufacturers Association
in cooperation with the
American Textile Manufacturers Institute
October 4th and 5th, 1965

It is a real pleasure for me to accept the responsibility of addressing the newsmen serving South Carolina, and to be on the program with such a distinguished group, whom you have already heard, and will hear in the course of this seminar. I consider each and every one of them good business men in the textile industry, and I am sure that each of you from the news media have or will receive from them the best information available today, relating to the textile industry.

The subject, Textiles in the Market Place, is so broad and complex that I want each of you to know at the outset that I do not pretend to be an expert, nor will I be able to cover for you every aspect. The market place for textile was known to most of us in the industry to be located in the Worth Street section of New York City in our early days, but we now find it has moved both in geographic locations and in growth and change. It would probably be well to review some of the early developments in the marketing of textiles, and our thoughts will leave out some of the major areas of textiles, such as yarns, etc, and think, in the main, about piece goods.

The textile industry, from the earliest times, has consisted of great numbers of widely scattered plants of various productions. Early mills sought distribution by consigning goods to storekeepers in various New England commercial centers. They acted as selling agents for mills then pioneering the technique of mass production, the inadequacies of this service, in which no certainty of volume markets, or certain payment of accounts accrued to the mill, were quickly apparent.

The next big step in distribution was use of wholesale commission merchants in the big Philadelphia, Baltimore and New York centers, which with the opening of Western trade, were providing surer outlets for substantial amounts of factory made goods. This was an improvement, but the relationship suffered as recurring manufacturing surpluses left these dealers with only periodic public auctions as a means of sale, a method of dubious value for the manufacturers.

The mill selling house, which devoted its full time to the needs of its textile mill clients, developed during the War of 1812 as the truly effective answer to sales problems of the industry, and has continued so with few modifications to the present. The selling houses pioneered mass marketing skills suited to the skills of mass factory production in the mills. They brought stability to existing mills and provided the base for further industrial expansion. Their position and value in textiles have been recognized as almost unique in American industry, and remain so for various mills. A great part of the plants on woven fabrics, and in other areas of industry, now spread from Maine to Texas.

Over the years, brokerage firms have come into being, and they have performed a specific purpose for the industry through the years.

In addition to the selling house and the brokerage firm, we find more and more mills entering into what I refer to as direct selling. At this point, it would probably be of interest to discuss the function of the three types of selling referred to above, and we find these functions being performed on a National and worldwide basis. The great majority of them operate from New York City. The prime task of the selling house is the sale of the products of mills they represent, through New York, through branches of the selling house, and other centers, and frequently, today, through foreign branches or export divisions. Thus the products of hundreds of plants at distant points are effectively and competively distributed to thousands of customers throughout this nation and the world.

No less important than the actual sale, however, is the likewise historic task of advising the mills. The textile industry makes countless constructions and fabrics, and countless finishes for a vast list of end uses. Fashion affects apparel and household lines.

New technical developments affect industrial fabrics. There is a constantly growing list of new fabrics with new properties and values. No period prior to the last two decades has been more explosive in technical development and complexity of the market mix of fibre, fabric and finish. It is at the market level, in a ferment of ideas between customers and selling houses, that a great part of this development takes place.

It is a duty of the selling house, therefore, to keep the mill posted on all matters affecting its products and market opportunities. Knowing the range of a mills equipment, it must advise the fabrics or constructions which it feels will be most wanted in the future. It may advise on whether they should be sold in the loom state, or to contract for finishing and selling in the finished state. It may council on shifts from one fibre to another, or to blends. This calls too for such advice as the seller can give on the probabilities of supply, demand and price in the general market. Thus the sales organizations serve as professional business advisers and market counselors to the mills they represent.

The services previously cited are those provided generally by the selling house for the mills it represents, subject to the requirements of its product. The relationship of selling houses and mills, however, differ. There are substantional numbers of selling houses owned by, or owning their own mills, and selling for such plants alone. There are also a substantial number of selling houses, which while they are owned by their own mills, for which they sell also, provide the same marketing services on a commission basis to independent mills. A good number of independent plants are family-owned concerns,

and the high and costly load of developing market facilities from the ground up is staggering, therefore, selling houses and brokerage firms play an important part in the textile market place, if the independent mills are to be able to obtain a well rounded selling service. Areas of independence with the selling house is usually stated by contract. The house in nearly all cases, is given the exclusive sales agency for the mill. Commission rates are stated; a low rate on greige goods, slightly higher on finished goods, and the highest rates usually on ready-for-the consumer products.

The mill retains complete control of prices, production, patterns of distribution, and hours of operation. Usually, no sale to a customer is binding until accepted by the mill. The contract with the selling house usually has a mutual cancellation clause, and a dissatisfied mill is free to transfer its account elsewhere on proper notice. Some independents have been sold through their present selling house, or its antecedents, for many years.

Brokerage firms perform services for the mills in a somewhat more limited area than the selling houses, and their major function is that of an agent, only.

Direct selling, of course, requires all of the aptitudes available, previously stated, plus greater market research, to keep the customer well informed and properly supplied, while generating a profit for the company.

All three of the types of selling I have mentioned operate in one or more of the various areas of griege sales, finishing services sales, finished goods sales, and end use sales. End use sales being those items such as domestics, hosiery, underwear, etc. The customers would be converters, cutters and retail outlets.

You have witnessed, during your visit, some of the most modern facilities in the industry today, indicating how far the industry has advanced in the technological improvevents, and no doubt continuing improvements in the technological field will be made in rapid strides in the immediate future. No longer can textile products be sold on the basis of art, and they will have to be sold on a basis which will combine the art with science. In my opinion, the selling methods have not improved as rapidly as the technical manufacturing methods, and there are a great many reasons for this.

The textile industry is, in fact, the conglomeration of diverse interest, that at times compete, and at times cooperate to the end of supplying the public on the most advantageous terms. It has large units and many medium and smaller size units. There is increased specialization. It is not uncommon for one textile company to buy from his competitor, sometimes due to this specialization, sometimes because of the firm having found markets beyond its ability to supply, sometimes for reasons of cost. Finishing plants frequently have capacity well beyond the means of owning mills, and they are selling finishing services to others. One plant may have a special greige production, which another requires for its special end use. One marketing staff may provide better results than others, or have special information or contacts in given fields. The best available facilities are best utilized in the textile market place. There are a few other items that may be of interest which would indicate some of the problems involved in selling products, that might help you in seeing its complexities.

1. Textile prices, profits and wage rates are consistently low when compared with other industries, ie. The four largest companies in the motor vehicle industry sells approximately 80.8% of the total dollar sales. The tobacco industry approximately 70.9%. In the petroleum industry, it is approximately 50.3%. In the rubber industry, approximately 48.1%, while in the textile industry, the four largest companies sales amount to approximately 22% of the total sales of the industry. In 1963 there were 4,435 plants with 20 or more employees, with sales being approximately 15,700,000,000 (fifteen billion, seven-hundred million). (Sales to date in 1965 indicate that on an annual rate, this year, sales should be approximately 16,500,000,000 (sixteen billion five-hundred million). Therefore, the average sales per plant in 1963 was

approximately three million, five-hundred fifty thousand dollars. The United States Federal Trade Commission and the Security and Exchange Commission shows that in the 1956 thru 1964 period, the average net return on sales for the textile industry was approximately 5.2%, and the best year for the textile industry, in this period, was approximately 5.9% for the textile industry, while other manufacturing industries had a return of approximately 11.5%.

2. Some piece goods have sold recently for less than final World War II selling prices.

3. Per capita, consumption has been declining.

4. Looms and spindles have been dropping. (1964-65 figures not available)

5. The market is a battle field in new and old fibres.

6. Textiles have been recognized in the late President Kennedy's 1960 program as presenting unique problems in the U. S. economy.

From the above statements, you can readily see that the marketing and selling of textiles must be done on a more scientific basis in the future, if the industry is to take its rightful place in the furnishing of employment and proper profit return to the stockholder, as well as developing the proper image.

It is my opinion, the efforts that will be set forth in the immediate future, through marketing research, along with good sound business principle, we will see that textiles will be marketed in a manner that will make up seven prouder of our industry than we now are, and I hope that this presentation has given you a view that will allow you to help us create an image to the public that we are an essential industry and should be respected with all other industries.

Thank you.

WHAT THEY WANT

The real aim of any company's sales program is to market products that its customers want at a realistic and fair price.

One major American company believes so strongly in this that it has placed on the desk of each of its executives a little plaque inscribed, "Give them what they want." The company isn't interested in what the executives **think** the customers want; they're supposed to **know.**

Whether customers are buying automobiles or yarn, sailboats or shirts, boxcars or cloth, they all want quality — a product that will do a specific job and hold up in the process of doing it.

(Continued on page 16)

New Products, New Problems And New Answers

The creative minds of textile scientists are constantly churning up ideas for new textile products — a situation which helps explain why American textiles are the world's best.

But for every new product these ideas cause, there is also a new problem and the need for a new answer.

For example, textile scientists are yet to find the limits of polyester fibers. They seem to work well in soft sweaters and rugged automobile tires. But when polyester fibers are first created and while they are being processed, a tremendous amount of static electricity is generated.

If the static is permitted to build high enough, polyester fibers will fly all over a room looking for a proper ground. The answer lies in a chemical pretreating process which eliminates all of the problem.

Nylon, the first of the "miracle" fibers, is perhaps best known and most popular in women's hosiery. But a nylon fiber thinner than than a human hair can wear through a stainless steel guide in a matter of days if it is not properly treated.

The reason for all of this, according to a textile scientists (Michel W. Avril of the Valchem Division of United Merchants and Manufacturers), is that when man-made fibers are first produced — by being squeezed through the tiny holes in a spinnerette — their molecules are disturbed. The molecules, the scientist says, are like wood chips on the surface of a pond. Individually, they are weak; together, they offer great strength.

The idea, then, is to pull them all together, in the same direction. This is done on high-speed machinery. The speed creates friction, the friction creates heat and the heat creates problems. So lubricants and chemical treatments for fibers — each precisely composed to do a specific job — have been created to eliminate the friction and heat problems without the speed.

Another instance in which the proper treatment of fibers has helped to create a better textile product is in certain types of carpet yarn. The yarn is made with a crimp, much like a lady's permanent. Too much friction could ruin the crimp, so a special treatment has been devised to permit the fiber to move at an even speed through machinery.

Even when the proper lubricants and chemical mixtures have been created, textile scientists are not necessarily without problems. In most instances, the treatments must be of a type which will not soak into yarns and which can be cleaned off the fibers when the pulling and moving is completed.

Thus, far, those problems have been solved, too.

Professional Development Program Establishes New Record

Courses for Professional Development were initiated in the School of Industrial Management and Textile Science, Clemson University, in the summer of 1958. Their purpose was, and is, to keep persons in industry abreast with advancement in science, technology, and management.

Some of the courses are for one week, but most cover a two-week period, and are offered only during the summer months. The courses are non-credit, however, a certificate is awarded upon satisfactory completion of a subject.

Most attending individuals stay in the University dorms, and have meals in the University dining room. Others commute, or stay at the Clemson House, the University hotel on campus.

Course content, and overall mechanics of the program, are constantly updated to give industry what it needs and has requested. During the years courses have been added, and plans are being made for additions in the 1966 summer program.

A large portion of the faculty for these courses is made up of faculty members of the School of Industrial Management and Textile Science. The remaining instructors are from other schools or colleges of the University.

To date, 638 individuals have completed a Professional Development course. Of this number, 146 attended during 1965 — a new record for any one summer's attendance.

The 146, a 67% increase over the previous summer, were from several types of industries, and represented 84 different position titles, 56 companies, and 91 industrial plants, located in 14 states and Canada.

A catalog, with application forms, will be placed in the mail in April. This will cover the Professional Development offerings for summer 1966. Anyone wishing a copy, or copies, should write Prof. C. V. Wray, Sirrine Hall, Clemson University, Clemson, South Carolina 29631.

WHAT THEY WANT

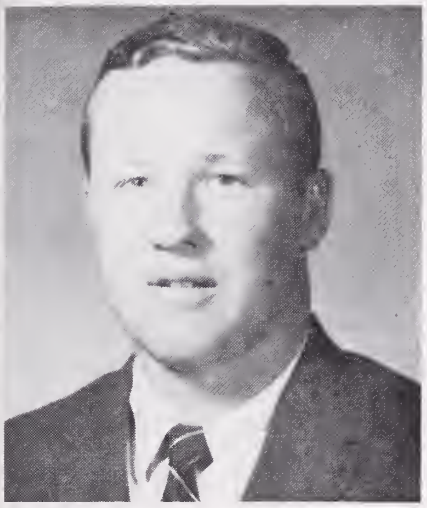
(Continued from page 15)

The textile industry has progressed for more than 170 years because of its ability to give its customers what they want. It has become a major industry because it is able to do more than barely satisfy man's need for shelter and clothing. It is a great industry because it knows the value of quality.

Every person in the industry, regardless of his job, has a hand in the preservation of that reputation.

Outstanding Seniors . . .

JOE WALDREP



Joe Waldrep is a twenty-two year old native of Roanoke, Alabama. He is majoring in Industrial Management and is a capable leader both on the football field and in the classroom.

Joe came to Clemson on a football scholarship and while here has participated in many phases of college life. He is a member of Phi Eta Sigma, Phi Kappa Phi, Blue Key, Tiger Brotherhood, Block "C" Club, Delta Kappa Alpha, The Industrial Management Society and the Society for Advancement of Management. He has played varsity football for three years, served as Junior Class President, and is now Chairman of Clemson's High Court. Just recently he received the honor of being listed with other select Clemson students in "Who's Who in American Colleges and Universities."

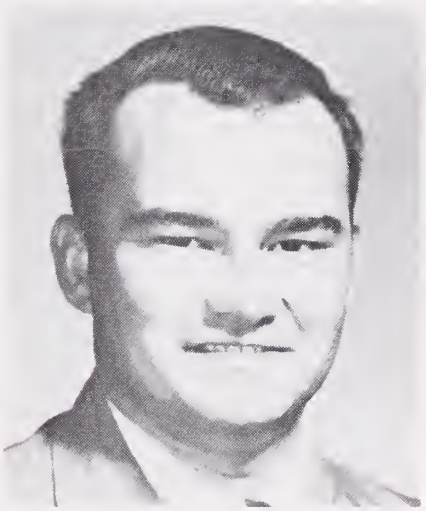
Joe has also found time to study and will graduate with a high grade point ratio. After graduation, he plans to attend law school or graduate business school but as yet he has not decided upon the institution.

JAMES ROBERT SMITH

James Robert Smith is a twenty-one year old Textile Management major from Laurens, South Carolina. He is married to the former Julia Pitts of Laurens.

To aid with his expenses at Clemson, James has received a Chemstrand Scholarship.

James is enrolled in Advanced Air Force ROTC and commands "V" Flight on the drill field. He is a member of the Arnold Air Society and Phi Psi Fraternity.



James has gained valuable experience in the textile industry by working three summers at Laurens Mills located in Laurens. He spent one of these summers working in the Industrial Engineering Department and the other two summers in the Knitting Department.

After graduation James plans to accept a commission in the Air Force in Category IN. After five years, he plans to take a position in the textile industry.

BRUCE R. EDWARDS

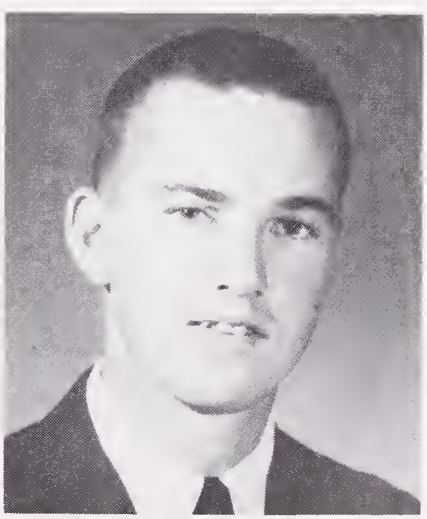
Bruce R. Edwards is a twenty-one year old Textile Chemistry major from Tryon, North Carolina.

To aid in his expenses at Clemson, Bruce has received a Leon-Lowenstein Foundation Scholarship for four years.

Bruce is a member of Phi Psi Fraternity and the American Association of Textile Chemists and Colorists. He has been on the Bobbin and Beaker Staff for two years and is currently serving his third year as a circulation manager.

Bruce has gained valuable experience in the field of Textile Chemistry by working in the lab of Pacific Mills, located in Lyman, South Carolina, for one summer and in the lab and dyehouse of Hatch Mill, located in Columbus, North Carolina, for two summers.

After graduation Bruce plans to do graduate work at the Institute of Textile Technology in Charlottesville, Virginia.



Mr. Smith Goes To Washington

Continued existence of the American cotton industry depends in large measure on continuation of a one-price cotton marketing system, a spokesman for the textile industry has told the Agriculture Committee of the U. S. House of Representatives.

J. Craig Smith of Sylacauga, Ala., a past president of the American Textile Manufacturers Institute, told the committee, "As the greatest consumer of American cotton, the American textile industry can speak with authority in saying that a permanent one-price system holds tremendous power to move the fiber through the mills to consumers.

"Textile mill management must make-long-range decisions regarding new mill construction, new product lines, research and promotion. These decisions are not going to be favorable to any fiber which is likely to be non-competitively priced. Therefore, I cannot over-emphasize the importance of a permanent one-price system for cotton."

Mr. Smith added, "The well-being of every person who looks toward the cotton industry for his livelihood, whether he is a cotton farmer or a cotton mill employee, is directly dependent upon the permanent continuation of a one-price cotton."

The House Agriculture Committee is presently considering a bill which would extend the one-price cotton program adopted in April 1964. The program provides that American mills must be able to purchase American cotton at the same price at which it is offered to foreign buyers.

Prior to adoption of the current program, foreign mills bought cotton under a two-price system that made American cotton up to $42.50 per bale cheaper for them than for American mills. The two-price system caused American mills to reduce their use of cotton and, also, resulted in greater imports of foreign textile products made with the cheaper cotton by low-wage labor.

Mr. Smith, who is president and treasurer of Avondale Mills and the only man ever to be president of both ATMI and the National Cotton Council, told the House Committee, "We have faith you will not let this great cotton industry be destroyed by a return to a two-price system."

He pointed out that since passage of the present program mill consumption of cotton has risen dramatically and should be more than 800,000 bales over last year. He also said that the industry has hired 29,000 more people than it had a year ago, that wages have been increased, expenditures for new plant and equipment are at record levels, and that loom operating hours have been at a record level during the past few months.

"There is absolutely no question but that the improvement was triggered by the law which enables American mills to buy American cotton at the same price it could be bought by foreign mills, "Mr Smith said. He added, "The textile industry is not advocating either a high price or a low price for cotton. But, a competitive price is mandatory if cotton is to share in the growing market for textile products."

The importance of removing uncertainty from the cotton marketing system is underlined, Mr. Smith said, by the textile industry's position as one of the most competitive industries in the United States.

"Prices of American textiles," he said, "always have been and today continue to be determined by supply and demand. Our customers create and develop demands or desires for products made from all fibers or blends of fibers or other materials. They are cost-conscious, and performance-conscious. They make the market.

"Long-range planning is a prime necessity all along the line . . . Long-range planning governs virtually all textile operations, and long-range planning is required for successful and efficient cotton farm operations. Long-range planning should dominate the government's cotton programs."

Mr. Smith appeared before the House Agriculture Committee as spokesman for ATMI, which is the textile industry's central trade association. As such, he represented textile companies and individuals throughout the United States.

Industrial Management Seminar Series In Tenth Year

Specialists in the fields of business, industry, and public service will lead the tenth annual Industrial Management Seminar Series during 1965-66. These men will address a group of some 250 of our industrial management students and faculty members.

The first seminar was conducted by Mr. D. F. Tucker, Atlanta, Georgia, and Mr. William Middleton, Greenville, South Carolina, both with S. S. Kresge Company. Their joint presentation related to "Revolutionary Trends in Retailing."

The second seminar will have Mr. R. Pat Jenkins, Greenville, South Carolina, as the speaker. Mr. Jenkins is design engineer for J. E. Sirrine Company, and

(Continued on page 21)

What are your plans after graduation?

When you cross from a life of preparing to one of performing, what kind of career should you choose? Are you thinking about research—academic or industrial? Or production, or sales, or management?

While you still have time to decide, why not have a talk with men who might offer new slants? These are men with a background of unusual accomplishment in textiles, chemistry, physics and other sciences—the men at Leesona.

Leesona Corporation is well known to every progressive textile man as the developer of the Unifil Loom Winder, the Uniconer Automatic Cone Winder, and other cost saving equipment that contribute much to improved textile production.

Leesona is known too, in other fields, for achievements that include:

Nuclear Batteries and Timing Devices, used in military and space systems.

Coil Winding Machinery, serving in control, communications, and automotive fields.

Research and Development, in such diverse areas as fuel cells . . . ICBM components . . . infra-red devices . . . electro-chemical power sources.

LEESONA

In expanding its activities in such areas, Leesona needs talent competent for scientific investigations. If you feel that the Leesona program may have potential for you in your own career, why not have a talk with a Leesona representative?

There are opportunities at Leesona for graduates whose chief talents and interests are in the fields of textiles, physics, mathematics, metallurgy, ceramics, electronics and all engineering disciplines. Just write to Personnel Director, Leesona Corporation, Warwick, Rhode Island.

To help you decide—talk to Leesona!

The one complete line of Shuttles and Shuttle Parts.

At FLETCHER SHUTTLES We Learned A Lesson

(from Aesop, of all people!)

Remember the hare and the tortoise?

He didn't know it, but Aesop planted a message in that story. It's guided us here at Fletcher Shuttles during these growing years.

Tortoise-like, we've been plodding. Moving ahead, yes, not like the hare, perhaps. But then, you won't catch us napping.

There's no mad rush to turn out quantity. Just a persistent drive to produce the finest quality shuttle it's possible to make.

Making a good shuttle takes skill and time — lots of time. Time for curing, for bonding and for testing. (That's why we're safe in guaranteeing the quality and performance of every shuttle.)

And it takes time to provide customer service. And to work out customer problems.

With business constantly increasing we've often needed more output. Instead of overworking our facilities on a hustle-bustle production schedule, we added more plant space. Three times in the last five years.

In shuttles, Fletcher is only third in the "Big 3." And when you're not first, you'd better take time to be best.

Maybe we're hard-shelled about this. But that's the tortoise in us.

FLETCHER
Shuttles

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Undergraduate Research Abstracts

A Study of the Effectiveness of Radio Stations in Oconee County

Furman D. Rochester

The purpose of this paper was to determine the effectiveness of radio broadcasting in Oconee County. A sample survey of the population was taken to determine the opinions of the listening audience.

After interviewing the managers of the two radio stations in the county, a questionnaire was compiled. Five hundred people from all over the county were questioned about the station they listened to most, their opinions of the personnel, and from what they receive most of their information. The answers were analyzed according to age group.

The survey showed that two-thirds of the people listened to the local stations more than they did out-of-county stations. A great majority said they received more advertising, news, and general information from radio than any other source. It was also determined that the younger age groups preferred station WGOG of Walhalla and the older groups preferred WSNW of Seneca. Sixty percent said the personnel was as good or better than the personnel of other stations to which they listened.

In general it can be concluded that the Oconee County radio stations are very effective units of business. A large percentage of people in the county are pleased with the operations of the two stations and express pride in having them in the county.

The Paperboard Box Market in Florida, Featuring Potlatch Forests' Southeast Packaging Division in Jacksonville, Florida

Jack S. Kelly

This research paper is a study of the market, market area, paperboard products, paperboard production processes in Florida, and Potlatch Forests' participation in the industry as a whole. Charts and graphs showing the plant, the market area, and distribution of the market are used to give an overall picture of the market potential in and around the Jacksonville plant. The information was gathered by plant visits, personal interviews, and through correspondence with the Florida Development commission. The study points out the tremendous market potential for Potlatch Forests' production of paperboard boxes in and around Jacksonville, and the potential for continued expansion of the firm in the future as in the past. The study is a comprehensive one covering all aspects of the industry. The value of the compiled study could be great, depending upon the interests of the reader.

A Study of the Growth and an Analysis of the Products of the Pennsylvania Transformer Company

D. O. Hopf and W. E. Theus

This paper is a study of the history, products, and importance of the Pennsylvania Transformer Division of McGraw-Edison Electric Company. Emphasis was placed on new developments that have been put into effect and how these developments have helped the company to better serve its customers. The position of Pennsylvania Transformer Company in the public utility field was analyzed along with its importance to the community and the responsibilities it bears to the McGraw-Edison Company were investigated.

Our observations were achieved by personal visits to Canonsburg, Pennsylvania Plant and the Company's Southeastern Sales Office in Atlanta. Other information was obtained through personal interviews with plant management, personnel, and sales staff. For purposes of presentation, we divided this information into five parts dealing with: History of the Company, Pennsylvania Transformer's place in the Industry and Community, Power Transformer Production, Distribution Transformer production, and an analysis of the benefits of the new Extra High Voltage Test Center. As a result of our research, we concluded that the merger with McGraw-Edison was the most important step in the company's history and with its new advancements in testing and production, Pennsylvania Transformer Company will continue to be a leader in the highly competitive electrical products field.

INDUSTRIAL MANAGEMENT SEMINAR

(Continued from page 19)

will use as a subject, "Choosing an Industrial Plant Site."

Mr. Jenkins will be followed, later in the year, by Hon. Robert L. Stoddard, Mayor of Spartanburg, South Carolina. Mayor Stoddard has been asked to speak on "Municipal Operations and Industrial Relations."

During the spring semester, the speakers will be:

Mr. C. S. Reed, Vice President, Duke Power Company, Charlotte, North Carolina. His subject will be "Times Are Changing."

Mr. W. C. Cobb, Vice President, Keyes Fibre Company, New York City. Mr. Cobb's presentation will deal with market development.

Mr. W. E. Reid, President, Riegel Textile Corporation, New York City. Mr. Reid will cover a timely and appropriate phase of textiles.

The seminar program, since 1955, has introduced more than 6,000 Clemson University students to many outstanding leaders in business, industry, and other fields. The School of Industrial Management and Textile Science is deeply indebted to all of these gentlemen for sharing of their time and thinking with our students and faculty.

Nylon was the first textile fiber compounded entirely from chemicals.

* * * * *

The sails on Christopher Columbus' three ships, the Nina, the Pinta and the Santa Maria, were made of a cotton fabric much like denim.

* * * * *

The United States Government owned almost 12-million bales of cotton at the close of the 1965 fiscal year on June 30, 1965.

* * * * *

More than 90 per cent of the chafer fabric in tubeless tires is made of man-made fibers.

* * * * *

Twenty-three nations are participants in a long-term arrangement which guides international trade in cotton textiles.

* * * * *

Textile mills in the Southeast account for 90 per cent of U. S. domestic cotton consumption.

* * * * *

American textile machinery manufacturers expect total sales of about 700-million in 1965.

Index to Advertisers

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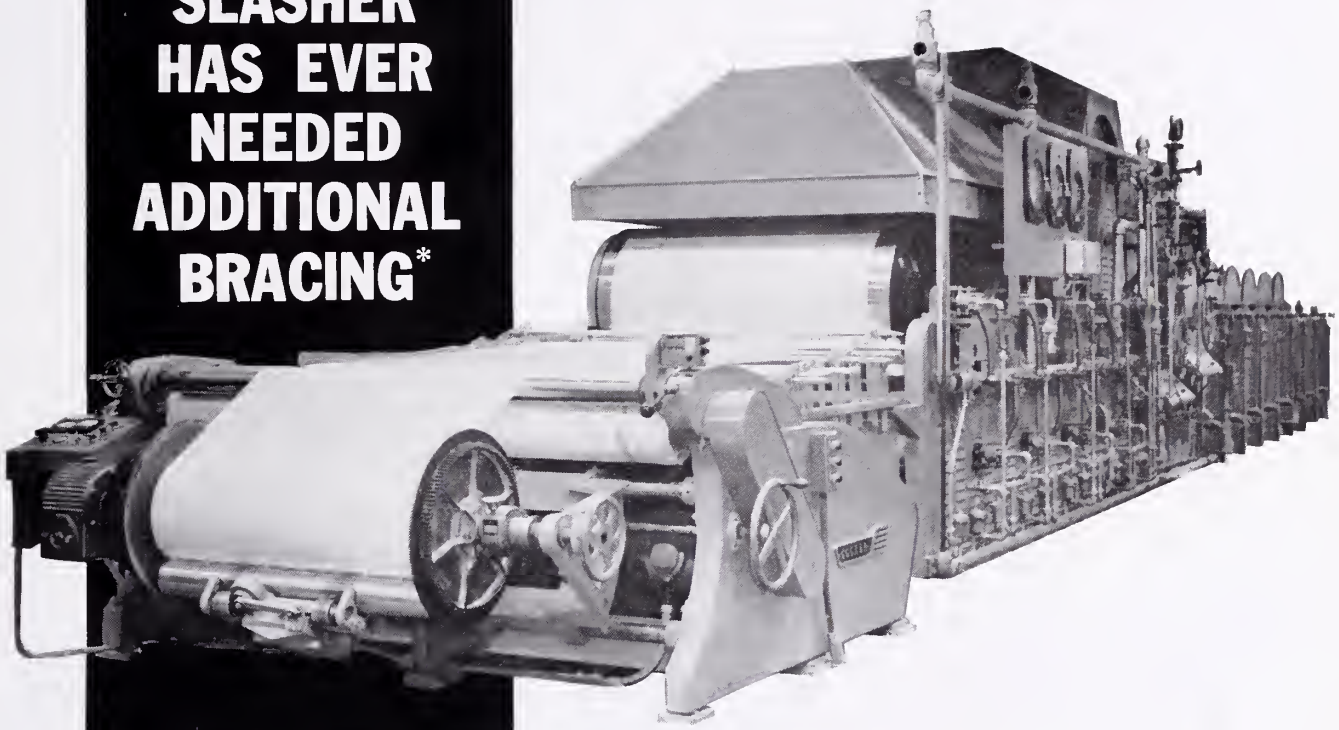

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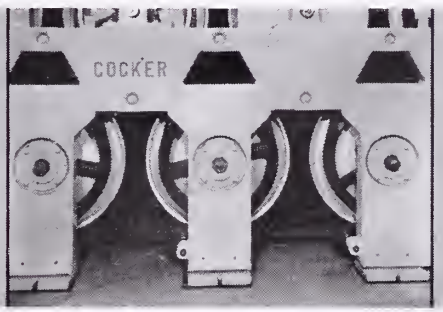
Cocker's exclusive HI/LO girting and "rigid bearing system" have proven amply adequate to handle the heavy, high-speed production loads for all types of fibers. Together with match-machined frames, they eliminate sway, vibration, and **misalignment.** They also eliminate defective warps and the expensive and production-losing job of installing the additional bracing which has been required on some other make slashers.

This is only one of the many exclusive features which permit Cocker Slasher owners to produce the World's most perfect warps, year after year, with an absolute minimum of maintenance and at rock-bottom cost. Let us send you complete information.



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